AF
SRJ

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **Ikuo TAKAHASHI** Group Art Unit: **1711**

Application Number: **10/698,934** Examiner: **Nathan M. Nutter**

Filed: **November 3, 2003** Confirmation Number: **5043**

For: **AN ALIPHATIC POLYESTER COMPOSITION, A MOLDED ARTICLE THEREOF AND A METHOD FOR CONTROLLING BIODEGRADATION RATE USING THE SAME COMPOSITION**

Attorney Docket Number: **032044**
Customer Number: **38834**

SUBMISSION OF SUPPLEMENTAL APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

October 24, 2007

Sir:

Appellants submit herewith a Supplemental Appeal Brief in the above-identified U.S. patent application.

The fee for the Appeal Brief was previously paid on October 5, 2007. If any additional fees are due in connection with this submission, please charge Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

Ryan B. Chirnomas
Attorney for Appellants
Registration No. 56,527
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

RBC/nrp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

SUPPLEMENTAL APPEAL BRIEF FOR THE APPELLANT

Ex parte Ikuo TAKAHASHI et al. (Applicant)

AN ALIPHATIC POLYESTER COMPOSITION, A MOLDED ARTICLE THEREOF AND A METHOD FOR CONTROLLING BIODEGRADATION RATE USING THE SAME COMPOSITION

Application Number: **10/698,934**

Filed: **November 3, 2003**

Appeal No.:

Group Art Unit: **1711**

Examiner: **Nathan M. Nutter**

Submitted by:
Ryan B. Chirnomas
Registration No. 56,527
Attorney for Appellants

WESTERMAN, HATTORI,
DANIELS & ADRIAN, LLP
1250 Connecticut Avenue NW, Suite 700
Washington, D.C. 20036
Tel (202) 822-1100
Fax (202) 822-1111

Date: October 24, 2007

SUPPLEMENTAL BRIEF ON APPEAL

(I) REAL PARTY IN INTEREST

The real party in interest is **NISSHINBO INDUSTRIES, INC.**, by an assignment recorded in the U. S. Patent and Trademark Office on **March 8, 2004**, at Reel **015047**, Frame **0088**.

(II) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellant, appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(III) STATUS OF CLAIMS

Claims 1, 3, 4 and 6-10 are pending in the application and are appealed. Claims 2 and 5 are cancelled. The appealed claims appear in the Claims Appendix.

(IV) STATUS OF AMENDMENTS

No amendments have been filed subsequent to the close of prosecution.

(V) SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1 is directed to an aliphatic polyester composition comprising (A) 100 parts by weight of aliphatic polyester (*i.e.,* page 8, line 28 to page 16, line 20), (B) 0.01 to 10 parts by weight of a carbodiimide compound (*i.e.*, page 16, line 22 to page 21, line 21), and (C) 0.01 to 10 parts by weight of at least one compound (*i.e.,* page 21, line 23 to page 25, line 1) selected from the group consisting of benzotriazole- (*i.e.,* page 22, line 5 to page 23, line 3), triazine- (*i.e.,* page 23, line 5 to page 24, line 12) and hydroxylamine-based (*i.e.,* page 24, lines 14-22) compounds.

Claim 8 is dependent on any of claims 1 to 7 and is directed at a molded article of a aliphatic polyester obtained by molding the aliphatic polyester composition according to any one of claims 1 to 7 (*i.e.,* page 27, lines 13-17).

Claim 10 is directed at a method for controlling a biodegradation rate an aliphatic polyester, characterized in that the aliphatic polyester (A) (*i.e.,* page 8, line 28 to page 16, line 20) is compounded with a carbodiimide compound (B) (*i.e.*, page 16, line 22 to page 21, line 21) and at least one compound (C) (*i.e.,* page 21, line 23 to page 25, line 1) selected from the group consisting of benzotriazole- (*i.e.,* page 22, line 5 to page 23, line 3), triazine- (*i.e.,* page 23, line 5 to page 24, line 12) and hydroxylamine-based (*i.e.,* page 24, lines 14-22) compounds to adjust its biodegradability, and requires that the biodegradation rate is controlled (*i.e.,* page 26, lines 14-19) by altering proportions of the carbodiimide compound (B) and the at least one compound (C) selected from the group consisting of benzotriazole-, triazine- and hydroxylamine-based compounds.

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 3, 4 and 6-10 are unpatentable under 35 U.S.C. §103(a) over Imamura et al. in view of Murschall et al. '758 or Murschall et al. '843.

Whether claims 1, 3, 4 and 6-10 are unpatentable under 35 U.S.C. §103(a) over Ariga et al. in view of Murschall et al. '758 or Murschall et al. '843.

Whether claims 1, 3, 4 and 6-10 are unpatentable on the ground of nonstatutory obviousness-type double patenting over claims 1-9 of co-pending Application No. 11/051,462 in view of Murschall et al. '758 or Murschall et al. '843.

Whether claims 1, 3, 4 and 6-10 are unpatentable on the ground of nonstatutory obviousness-type double patenting over claims 1-13 of co-pending Application No. 11/172,904 in view of Murschall et al. '758 or Murschall et al. '843.

(VII) ARGUMENT

The Nature of the Pending Rejection relying on Imamura (§102 or §103)

In the Final Office Action, the Examiner presented an alternative interpretation of Imamura for the first time. Specifically, the Office Action states that Imamura teaches at column 19, lines 32-38 the inclusion of (a) an oxidation inhibitor, (b) "an ultraviolet absorbent such as ...(c) benzotriazole *or* a stabilizer...***and*** (d) a carbodiimide." April 16, 2007 Office Action, page 9, lines 3-12. The emphasis and notations of "(a)", "(b)", "(c)" and "(d)" were added by the

Examiner. Accordingly, the Office Action states that "either (a) or (b) or (c) is used, and (d) is used. That clearly embraces the choice of (b) benzotriazole and (d) carbodiimide." *Id.*

Appellants respectfully argue that the April 16, 2007 Office Action thus inherently contradicts its own position. Even if, *arguendo*, Imamura actually disclosed the simultaneous use of a benzotriazole and a carbodiimide, the Office Action would have made a rejection based on 35 U.S.C. §102. However, the pending rejection which relies on Imamura is a 35 U.S.C. §103 rejection. In the Advisory Action dated July 19, 2007, the Examiner states that "the secondary reference may not be necessary to establish a prima facie case of obviousness. Regardless, the rejection was made in view of the secondary references."

Appellants respectfully argue that the Examiner acquiesces to the fact that Imamura does not teach the conjunctive use of benzotriazole and carbodiimide, since the Office Action relies on Murschall '758 or Murschall '843 to provide this teaching. Further, Appellants discuss below why Imamura does not disclose the conjunctive use of benzotriazole and carbodiimide.

Imamura does not disclose or suggest the conjunctive use of benzotriazole and carbodiimide

As discussed above, the Examiner contradicts himself in the April 16, 2007 Office Action with respect to his position regarding the disclosure of Imamura. Appellants respectfully argue that the Examiner's position that Imamura "clearly embraces the choice of (b) benzotriazole and (d) carbodiimide" is inaccurate and is based on a manipulation of the sentence structure of the

relevant passage of Imamura. In order to arrive at this position, the Examiner states that Imamura teaches that (a) an oxidation inhibitor, (b) "an ultraviolet absorbent such as ....(c) benzotriazole *or* a stabilizer...***and*** (d) a carbodiimide may be used." As stated above, the emphasis and notations of "(a)", "(b)", "(c)" and "(d)" were added by the Examiner.

The relevant original passage of Imamura is reproduced below:

> Further, an oxidation inhibitor such as 2,6-di-t-butyl-4-methylphenol (BHT) and butyl hydroxyanisole (BHA), an ultraviolet absorbent such as salicylic acid derivative, benzophenone and benzotriazole or a stabilizer such as phosphoric ester and carbodiimide may be used to enhance the thermal stability during formation. Column 19, lines 32-38.

Appellants respectfully submit that this passage is improperly interpreted by the Examiner. This passage actually teaches that one of an oxidation inhibitor, an ultraviolet absorbent, or a stabilizer may be used to enhance the thermal stability during formation. According to this passage, 2,6-di-t-butyl-4-methylphenol (BHT) and butyl hydroxyanisole (BHA) are examples of an oxidation inhibitor; salicylic acid derivative, benzophenone and benzotriazole are examples of an ultraviolet absorbent; and phosphoric ester and carbodiimide are examples of a stabilizer. Thus, it is clear that this passage is a list of possible classes of additives, each having two or three examples.

The disclosure of this passage may be summarized as follows. Please note that emphasis and notations of "(a)", "(b)", "(c)", etc. are added below by Appellant for clarity.

> In order to enhance thermal stability during formation, the compound may include:
> (a) an oxidation inhibitor such as:
> (a1) 2,6-di-t-butyl-4-methylphenol (BHT) and
> (a2) butyl hydroxyanisole (BHA),

or
(b) an ultraviolet absorbent such as:
(b1) salicylic acid derivative,
(b2) benzophenone and
(b3) benzotriazole,
or
(c) a stabilizer such as
(c1) phosphoric ester and
(c2) carbodiimide.

In fact, this reading of Imamura is further strengthened by the similar disclosure in Ariga. Please see column 14, lines 25-32 of Ariga, which discloses:

> In addition, the thermal stability during molding of the polyester composition (VI) of the present invention can be improved by using an antioxidant such as 2,6-di-t-butyl4-methylphenol (BHT) or butyl-hydroxyanisol (BRA), an ultraviolet absorber such as salicylic acid derivatives or benzophenone- and benzotriazole-based ultraviolet absorbers, or a stabilizer such as phosphate ester, isocyanate or carbodiimide.

Thus, Appellants respectfully argue that the Examiner's interpretation of Imamura at page 9, lines 3-12 of the April 16, 2007 Office Action is improper and is based on a manipulation of the sentence structure of the relevant passage of Imamura. Appellants strongly refute the interpretation of Imamura to disclose the conjunctive use of benzotriazole and carbodiimide.

Although Imamura and Ariga disclose the *alternative* use of benzotriazole OR carbodiimide, it would not have been obvious *conjunctively* use benzotriazole AND carbodiimide

It is the position of the Office Action dated April 16, 2007 that Imamura and Ariga disclose the production of a polyester from aliphatic components. The Examiner further relies on

Imamura and Ariga to teach the inclusion of ultraviolet inhibitors, including benzotriazoles and a stabilizer including carbodiimides. Both Imamura and Ariga disclose the use of benzotriazole **or** carbodiimides. The Examiner relies on Murschall '758 and Murschall '843 to teach the conjunctive use of a benzotriazole as an ultraviolet inhibitor **and** a carbodiimide as a stabilizer. The Examiner argues that "[t]he employment of the two recited additives is deemed to be conventional to those having ordinary skill in the art, and subsequent use in the composition of Imamura et al [or Ariga et al], on the suggestion thereof would have been obvious to an artisan of ordinary skill." April 16, 2007 Office Action, page 6, lines 20-23.

On February 26, 2007, Appellants filed a Declaration by co-inventor Hirotaka Iida, presenting evidence of unexpected results. In response to the Declaration by Iida filed on February 26, 2007, the Examiner stated, in the Office Action dated April 16, 2007, that the Declaration "has been considered, but is not deemed to be relevant." Page 2, lines 9-10. The Examiner states that the Declaration did not address the reasons for the rejections.

Appellants also note that a Declaration similar to the February 26, 2007 Iida Declaration was submitted on October 5, 2006. The October 5, 2006 Declaration by Iida provided data showing that the combination of a thermoplastic polyurethane (U, for reference in discussion) with carbodiimide (B) and benzotriazole (C) did not result in an improvement of hydrolysis resistance strength as compared to a combination of thermoplastic polyurethane (U) and carbodiimide (B), without benzotriazole (C). This Declaration was successful in overcoming the

rejections based on Imamura or Ariga in view of Kaufhold '266, Kaufhold '995, and Prissok et al.

The Examiner's apparent reason for considering the February 2007 Declaration not relevant was that the Declaration discussed aromatic polyesters, while the disclosure of Imamura, Ariga and the present invention is directed at aliphatic polyesters. The Examiner states that "[t]he secondary references show the employment of the carbodiimides and benzotriazole compounds as known to be used together in polyesters." April 16, 2007 Office Action, page 2, lines 17-18.

Appellants note that polyesters may be aliphatic polyesters, aromatic polyesters, or a combination thereof, depending on the presence or absence of an aromatic ring. Additionally, Appellants note that aliphatic polyesters and aromatic polyesters have different properties.

With regard to benzotriazole and carbodiimide, the Office Action states that Murschall '758 and Murschall '843 were "both relied upon solely to show the known use of these constituents together." However, as explained by MPEP §716.02(a)(II), "[e]vidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness." Furthermore, as stated in *In re Soni*, "when an applicant demonstrates substantially improved results...and states that the results were unexpected, this should suffice to establish unexpected results in the absence of evidence to the contrary." 34 USPQ2d 1684, 1688 (Fed. Cir. 1995). Appellants note that the importance of "meaningful consideration" of declarations arguing secondary considerations, such

as unexpected results, was recently addressed by the Court of Appeals for the Federal Circuit in *In re Sullivan*. 2007 U.S. App. LEXIS 20600 (Fed. Cir. 2007).

To summarize the content of the cited art, both Imamura and Ariga disclose the use of (A) aliphatic polyesters. Both Imamura and Ariga disclose the use of (B) carbodiimide ***or*** (C) benzotriazole, to improve thermal resistance. Additionally, both Murschall '758 and Murschall '843 disclose the use of aromatic polyesters (Z, for reference in discussion) such as polyethylene terephthalate (PET), in combination with (B) carbodiimide ***and*** (C) benzotriazole. Thus, Imamura and Ariga disclose A + (B/C), while Murschall '759 and Murschall '843 disclose (Z) + (B) + (C).

The Iida Declaration clearly shows that hydrolysis resistance is improved in a compound having (A) + (B) + (C), as compared to a compound having (A) + (B). Please see Table A of the Declaration. Example 4, Additional Experiment 1 and Additional Experiment 2 each have (A) + (B) + (C). These Experiments have hydrolysis resistance strength ratios of 98%, 88% and 83%, respectively. On the other hand, Comparative Example 4 has (A) + (B), without (C). This Experiment has a hydrolysis resistance strength ratio of 37%. Thus, the conjunctive use of (B) carbodiimide and (C) benzotriazole with the aliphatic polyester (A) unexpectedly resulted in a dramatically improved hydrolysis resistance strength ratio.

However, a dramatic improvement in hydrolysis resistance strength is not always seen when (B) and (C) are used in conjunction. Please see Table B of the Declaration. Additional Experiment 3 has polyethylene terephthalate (PET), an aromatic polyester (Z), together with (B)

carbodiimide and (C) benzotriazole. This Experiment exhibited a hydrolysis resistance strength ratio of 67%. Meanwhile, Additional Experiment 4 has (Z) + (B), without the use of (C). This Experiment exhibited a hydrolysis resistance strength ratio of 70%. Thus, the conjunctive use of (B) + (C) alone did not result in a significant improvement of the hydrolysis resistance strength ratio.

Appellants note that Additional Experiments 3 and 4 were tested by a different method as Example 4, Additional Experiment 1, Additional Experiment 2 and Comparative Example 4. Namely, Additional Experiments 3 and 4 were tested at 120°C and 90% RH for 120 hours, while Example 4, Additional Experiment 1, Additional Experiment 2 and Comparative Example 4 were tested at 80°C and 90% RH for 150 hours. This because the PET used in Additional Experiments 3 and 4 essentially have a relatively high hydrolysis resistance. For this reason, in order to detect hydrolysis of the PET within a reasonable experimental period, conditions for experiments for Experiments 3 and 4 must be more severe than those for other experiments using polylacetic acid.

In view of this Declaration, it is abundantly clear that it is not the mere combination of benzotriazole and carbodiimide ((B) + (C)) which results in the improvement of hydrolysis resistance. Although (B) + (C) are known to be used in conjunction with aromatic polyesters, it would not have been obvious to use (B) + (C) in conjunction with aliphatic polyesters. The use of (B) + (C) does not necessarily result in an improvement of hydrolysis resistance strength ratio. One having ordinary skill in the art would not have predicted that combining (A) + (B) + (C)

would result in dramatically improved hydrolysis resistance. It is only the claimed inventive combination of (A) + (B) + (C) which results in the improved hydrolysis resistance strength, an unexpected synergistic effect. According to MPEP §716.02(a), evidence of a greater than expected result may be shown by demonstrating an effect which is greater than the sum of each of the effects taken separately (i.e., demonstrating "synergism"). *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989).

As discussed above, neither Imamura nor Ariga disclose or suggest using both benzotriazole ***and*** carbodiimde, but rather present these as alternative compounds for improving thermal resistance. Because the combination of benzotriazole and carbodiimide is clearly shown by the Declarations not to necessarily result in a benefit in improved hydrolysis resistance strength, one having ordinary skill in the art would not have been motivated to use them together. One having ordinary skill in the art would not have found it obvious to combine an aliphatic polyester (A) with carbodiimide (B) ***and*** benzotriazole (C) in the recited amounts, in order to obtain the above-referenced unexpected synergistic effects.

Double Patenting Rejections

It is the position of the Office Action that each of the '462 application and the '904 application discloses the manufacture of a biodegradable plastic using a carbodiimide and optionally including an ultraviolet absorber. The Examiner relies on Murschall '758 or Murschall '843 to disclose the use of a benzotriazole as an ultraviolet absorber.

Appellants note that although the rejection relying on the '462 application is described as a provisional rejection in the Final Office Action, the '462 application matured into U.S. Patent No. 7,129,190 on October 31, 2006. However, with respect to the '904 application, this rejection remains a provisional rejection. Appellants note that they did not reply to the pending Office Action in the '904 application. Thus, the '904 application has been abandoned. Accordingly, the double patenting rejection relying on the '904 application is moot.

Like Imamura and Ariga, the '462 application (now the '190 patent), only discloses the alternative use of benzotriazole *or* carbodiimide with an aliphatic polyester. The Examiner relies on the Murschall references to teach the conjunctive use of benzotriazole *and* carbodiimide. However, although Appellants submit that the double patenting rejection should be withdrawn at least for similar reasons as those discussed above regarding the non-obviousness of the combination of Imamura or Ariga with Murschall '758 or Murschall '843, Appellants herewith submit a Terminal Disclaimer in order to obviate this rejection, thus simplifying the issues on appeal for the Board. Thus, both double patenting rejections are moot.

Appellants respectfully submit that the discussion above, in conjunction with the experimental results of the Declaration by Iida filed on February 26, 2007, is sufficient to rebut at alleged case of *prima facie* obviousness. Accordingly, Appellants respectfully submit that the invention as claimed is not obvious in view of (i) Imamura et al. in view of Murschall et al. '758 or Murschall et al. '843, (ii) Ariga et al. in view of Murschall et al. '758 or Murschall et al. '843,

(iii) claims 1-9 of co-pending Application No. 11/051,462 in view of Murschall et al. '758 or Murschall et al. '843, and (iv) claims 1-13 of co-pending Application No. 11/172,904 in view of Murschall et al. '758 or Murschall et al. '843.

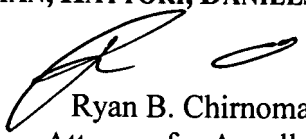
(VIII) CONCLUSION

For the foregoing reasons, the Examiner has failed to raise a prima facie rejection of the claims. The Honorable Board is respectfully requested to reverse the rejection of the Examiner.

If this paper is not timely filed, appellants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to Deposit Account No. 50-2866, along with any other additional fees that may be required with respect to this paper.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Ryan B. Chirnomas
Attorney for Appellants
Registration No. 56,527
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

RBC/nrp

(IX) CLAIMS APPENDIX

Claim 1. An aliphatic polyester composition comprising (A) 100 parts by weight of aliphatic polyester, (B) 0.01 to 10 parts by weight of a carbodiimide compound, and (C) 0.01 to 10 parts by weight of at least one compound selected from the group consisting of benzotriazole-, triazine- and hydroxylamine-based compounds.

Claim 3. The aliphatic polyester composition according to claim 1, characterized in that said triazine-based compound is a triazine-based ultraviolet absorber or triazine derivative having at least one amino group in the molecule.

Claim 4. The aliphatic polyester composition according to claim 1, characterized in that said hydroxylamine-based compound is N-hydroxybenzotriazole or N-hydroxysuccinimide.

Claim 6. The aliphatic polyester composition according to claim 1, characterized in that said carbodiimide compound (B) is aliphatic polycarbodiimide.

Claim 7. The aliphatic polyester composition according to claim 6, characterized in that said aliphatic polycarbodiimide compound has an isocyanate terminal.

Claim 8. A molded article of a aliphatic polyester obtained by molding the aliphatic polyester composition according to any one of claims 1 to 7.

Claim 9. The molded article of the aliphatic polyester according to claim 8, which is in the form of molded article, extrudate, blow-molded article, thermally molded article, fiber, non-woven fabric, film or sheet.

Claim 10. A method for controlling a biodegradation rate an aliphatic polyester, characterized in that the aliphatic polyester (A) is compounded with a carbodiimide compound (B) and at least one compound (C) selected from the group consisting of benzotriazole-, triazine- and hydroxylamine-based compounds to adjust its biodegradability,

wherein said biodegradation rate is controlled by altering proportions of said carbodiimide compound (B) and said at least one compound (C) selected from the group consisting of benzotriazole-, triazine- and hydroxylamine-based compounds.

(X) EVIDENCE APPENDIX

Copies of (i) the Declaration by co-inventor Hirotaka Iida filed on October 5, 2006 and (ii) the Declaration by co-inventor Hirotaka Iida filed on February 26, 2007 are attached hereto.

(XI) RELATED PROCEEDINGS APPENDIX

No Related Proceedings.

UNITED STATES PATENT AND TRADEMARK OFFICE

RBC

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,934	11/03/2003	Ikuo Takahashi	032044	5043

38834 7590 10/19/2007

EXAMINER

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

ART UNIT	PAPER NUMBER

DATE MAILED: 10/19/2007

Please find below and/or attached an Office communication concerning this application or proceeding.

Non-Compliant
Appeal Brief
DOCKETING

INITIALS: ea
DATE DOCKETED: Oct. 19, 2007
TYPE OF RESPONSE: Amd
DUE DATE: Nov. 19, 2007

Notification of Non-Compliant Appeal Brief (37 CFR 41.37)	Application No. 10/698,934	Applicant(s) TAKAHASHI ET AL.	
	Examiner NUTTER	Art Unit 1796	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The Appeal Brief filed on *05 October 2007* is defective for failure to comply with one or more provisions of 37 CFR 41.37.

To avoid dismissal of the appeal, applicant must file anamended brief or other appropriate correction (see MPEP 1205.03) within **ONE MONTH or THIRTY DAYS** from the mailing date of this Notification, whichever is longer. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136.**

1. ☐ The brief does not contain the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order.

2. ☒ The brief does not contain a statement of the status of all claims, (e.g., rejected, allowed, withdrawn, objected to, canceled), or does not identify the appealed claims (37 CFR 41.37(c)(1)(iii)).

3. ☐ At least one amendment has been filed subsequent to the final rejection, and the brief does not contain a statement of the status of each such amendment (37 CFR 41.37(c)(1)(iv)).

4. ☐ (a) The brief does not contain a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings, if any, by reference characters; and/or (b) the brief fails to: (1) identify, for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function under 35 U.S.C. 112, sixth paragraph, and/or (2) set forth the structure, material, or acts described in the specification as corresponding to each claimed function with reference to the specification by page and line number, and to the drawings, if any, by reference characters (37 CFR 41.37(c)(1)(v)).

5. ☐ The brief does not contain a concise statement of each ground of rejection presented for review (37 CFR 41.37(c)(1)(vi))

6. ☐ The brief does not present an argument under a separate heading for each ground of rejection on appeal (37 CFR 41.37(c)(1)(vii)).

7. ☐ The brief does not contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(viii)).

8. ☐ The brief does not contain copies of the evidence submitted under 37 CFR 1.130, 1.131, or 1.132 or of any other evidence entered by the examiner **and relied upon by appellant in the appeal**, along with a statement setting forth where in the record that evidence was entered by the examiner, as an appendix thereto (37 CFR 41.37(c)(1)(ix)).

9. ☐ The brief does not contain copies of the decisions rendered by a court or the Board in the proceeding identified in the Related Appeals and Interferences section of the brief as an appendix thereto (37 CFR 41.37(c)(1)(x)).

10. ☐ Other (including any explanation in support of the above items):

(2) The brief does not contain the status of all the claims in the application. The status of cancelled claims 2 and 5 are not included in the status of claims section.

REGINALD TYSON
PATENT APPEALS SPECIALIST
571-272-1634

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: **Ikuo TAKAHASHI et al.**

Group Art Unit: **1711**

Application Number: **10/698,934**

Examiner: **Nathan M. Nutter**

Filed: **November 3, 2003**

Confirmation Number: **5043**

For: **AN ALIPHATIC POLYESTER COMPOSITION, A MOLDED ARTICLE THEREOF AND A METHOD FOR CONTROLLING BIODEGRADATION RATE USING THE SAME COMPOSITION**

Attorney Docket Number: **032044**
Customer Number: **38834**

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Hirotaka Iida, a citizen of Japan, hereby declare and state the following:

1. I graduated from Nagoya Institute of Technology of Nagoya, Aich, Japan in 1987 with a Bachelor of Science in Engineering Technology in Polymer Engineering.

2. Since 1987, I have been employed by Nisshinbo Industries, Inc., 2-31-11, Ningyo-cho, Nihonbashi, Chuo-ku, Tokyo, Japan where my present title is Research and Development. During my employment therein, I have conducted research and development on modifiers of polyester resins.

3. I have read and am familiar with the above-identified patent application as well as the Official Action dated November 27, 2006, in the application.

4. I have read and am familiar with the contents of cited references, U. S. Patent Nos. 5,616,657 to Imamura, 6,803,443 to Ariga et al., and 6,855,759 to Murschall et al.; and U.S. Patent Application Publication No. 2003/091843 to Murschall et al., cited in the Official Actions in the above-identified application.

5. Under my supervision and control, I conducted experiments to obtain data to show that a carbodiimide compound and a benzotriazole-based compound do not exhibit a synergistic effect when they are used together with an aromatic polyester.

6. The following explains the experiment and data.

Each of the Additional Experiments 1-4 were conducted in substantially the same manner as in Example 4, except the indicated differences in composition as presented in Tables A and B.

Additional Experiments 1 and 2 utilize an *aliphatic* polyester, polylactic acid. Meanwhile, Additional Experiments 3 and 4 utilize an *aromatic* polyester, polyethylene terephthalate (PET). Additional Experiments 1 and 2 utilize both carbodiimide and a benzotriazole (Tinuvin 234) with an aliphatic polyester, and exhibit excellent hydrolysis resistance. See Table A.

Additional Experiment 3 utilizes both carbodiimide and a benzotriazole (Tinuvin 234) with an aromatic polyester. Additional Experiment 4 utilizes only carbodiimide with an aromatic polyester. Additional Experiments 3 and 4 exhibited hydrolysis resistance of 67% and 70%, respectively. Additional Experiment 3 is similar to the disclosure of Murschall '758 and '843. Additional Experiment 4 is similar to Murschall '758 and '843, except that a benzotriazole is not used. See Table B.

Table A

	Example 4	Additional Experiment 1	Additional Experiment 2	Comparative Example 4
1.Composition (parts-by-weight)				
(A) Polyester				
-Polylactic acid (aliphatic)	98.5	98.5	98.8	99
-Polyethylene terephthalate (aromatic)	-	-	-	-
(B) Carbodiimide compound				
-Compound prepared in Synthesis Example 1 to have isocyanate group at the terminal	1	1	1	1
(C) Specified compound				
-Tinuvin 234	-	0.5	0.2	-
-Tinuvin 326	0.5	-	-	-
2. Evaluation Results				
Hydrolysis resistance #1 Strength ratio (%)	98	88	83	37

#1: Tested at 80°C and 90% RH for 150 hours

Table B

	Additional Experiment 3	Additional Experiment 4
1.Composition (parts-by-weight)		
(A) Polyester		
-Polylactic acid (aliphatic)	-	-
-Polyethylene terephthalate (aromatic)	98.8	99
(B) Carbodiimide compound		
-Compound prepared in Synthesis Example 1 to have isocyanate group at the terminal	1	1
(C) Specified compound		
-Tinuvin 234	0.2	-
-Tinuvin 326	-	-
2. Evaluation Results		
Hydrolysis resistance #2 Strength ratio (%)	67	70

#2: Tested at 120°C and 90% RH for 120 hours.

Incidentally, it is noted that PET was used in Additional Experiments 3 and 4, and has a different hydrolysis resistance than polylactic acid. Accordingly, in order to detect hydrolysis resistance of the PET within a reasonable period of time, the conditions for testing Additional Experiments 3 and 4 must be more severe (higher temperature) than those of the other experiments using polylactic acid.

Additional Experiment 3 is identical to Additional Experiment 4, except that a benzotriazole is added. However, Additional Experiments 3 and 4 clearly show that even when a benzotriazole is added, there was no increase in hydrolysis resistance. In fact, the hydrolysis resistance was slightly lower when a benzotriazole was added in Additional Experiment 3. Thus, no unexpected synergistic effect is present. See Table B.

On the other hand, Example 4 and Additional Experiments 1 and 2 exhibited a significant increase in hydrolysis resistance upon the addition of benzotriazole, as compared with an absence of benzotriazole in Comparative Example 4. Thus, an unexpected synergistic effect is present. See Table A.

7. From the attached experimental results, I have concluded, among other things, that a carbodiimide compound and a benzotriazole-based compound do not exhibit a synergistic effect when they are used together with an aromatic polyester.

The undersigned declares that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Hirotaka Iida

Hirotaka Iida

Signed this 13 day of February, 2007.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of: **Ikuo TAKAHASHI et al.** Group Art Unit: **1711**

Application Number: **10/698,934** Examiner: **Nathan M. Nutter**

Filed: **November 3, 2003** Confirmation Number: **5043**

For: **AN ALIPHATIC POLYESTER COMPOSITION, A MOLDED ARTICLE THEREOF AND A METHOD FOR CONTROLLING BIODEGRADATION RATE USING THE SAME COMPOSITION**

Attorney Docket Number: **032044**
Customer Number: **38834**

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

October 5, 2006

Sir:

I, Hirotaka Iida, a citizen of Japan, hereby declare and state the following:

1. I graduated from Nagoya Institute of Technology of Nagoya, Aich, Japan in 1987 with a Bachelor of Science in Engineering Technology in Polymer Engineering.

2. Since 1987, I have been employed by Nisshinbo Industries, Inc., 2-31-11, Ningyo-cho, Nihonbashi, Chuo-ku, Tokyo, Japan where my present title is Research and Development. During my employment therein, I have conducted research and development on modifiers of polyester resins.

3. I have read and am familiar with the above-identified patent application as well as the Official Action dated June 8, 2006, in the application.

4. I have read and am familiar with the contents of cited references, U. S. Patent Nos. 5,616,657 to Imamura; 6,803,443 to Ariga et al.; 6,559,266 to Kaufhold et al.; 6,527,995 to Kaufhold et al.; and 5,900,439 to Prissok et al. cited in the Official Actions in the above-identified application.

5. Under my supervision and control, I conducted experiments to obtain data to show that a carbodiimide compound and a benzotriazole-based compound do not exhibit a synergistic effect when they are used together with a polyurethane resin.

6. The following explains the experiment and data.

Sample 1: Pellets of ET690-10 (ester-type thermoplastic polyurethane manufactured and sold by BASF) were used as Sample 1.

Sample 2: Pellets of ET690-A10 (ester-type thermoplastic polyurethane manufactured and sold by BASF) were used as Sample 2.

Sample 3: An ether-type thermoplastic polyurethane was prepared by the following method and used as Sample 3:

A reaction vessel was charged with 58.3 parts by weight of a polytetramethyleneether glycol (PTMG) having a molecular weight of 2000 (as a polyol) and 33.0 parts by weight of 4,4'-diphenylmethane diisocyanate (MDI) (as an organic diisocyanate) and a polymerization reaction was conducted at 130°C under nitrogen atmosphere for 60 minutes to thereby obtain a polymer.

8.7 parts by weight of 1,4-butanediol (as a chain extender) was added to the prepolymer and a reaction was conducted for 15 minutes under the same conditions as above to thereby obtain a thermoplastic polyurethane having an NCO index of 1.05. The obtained polymer was pulverized to thereby obtain this polymer in the form of flakes.

To the thermoplastic polyurethanes of Samples 1-3, "CARBODILITE HMV-8CA®" (as a carbodiimide compound) and "TINUVIN T234®" (as a benzotriazole compound) were dry blended in the ratios shown in the following Table A, followed by mixing in a twin screw extruder to prepare a film with a thickness of 200 μm through T-die. Each film was punched by a JIS No. 4 dumbbell to prepare the test piece, which was evaluated for it resistance to hydrolyis.

Each test sample piece was left in an air conditioned chamber maintained at 80°C and 90% RH for 170 hours, and ratios (%) of tensile strength and elongation after the test to the values before the test were calculated. Hydrolysis resistance was ranked as "good" for the sample with high ratios (%) of tensile strength and elongation. Table A gives the compositions and evaluation results.

Table A

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Sample 1	49.5	49	-	-
Sample 2	-	-	99	98
Sample 3	49.5	49	-	-
HMV-8CA	1	1	1	1
T234	-	1	-	1
Hydrolysis resistance strength ratio (%)	78.5	74.8	77.3	75.0

As shown in Table A above, comparison of Experiments 1 and 3 (each in which only a carbodiimide compound is used) with Experiments 2 and 4 (each in which only a carbodiimide compound is used in combination with a benzotriazole compound UV absorber) clearly shows that the combination use of a carbodiimide compound and a benzotriazole compound provides substantially no change in the hydrolysis resistance (strength ratio) of the film. That is, a

carbodiimide compound and a benzotriazole-based compound do not exhibit a synergistic effect, when they are used in a composition containing a polyurethane resin.

It is noted that each of Experiments 1 and 3 show relatively high hydrolysis resistance. This is because the hydrolysis resistence of a polyurethane resin itself is high, relative to that of a polylactic acid or PBS used in the specification.

7. From the attached experimental results, I have concluded, among other things, that a carbodiimide compound and a benzotriazole-based compound do not exhibit a synergistic effect when they are used together with a polyurethane resin.

The undersigned declares that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Hirotaka Iida

Hirotaka Iida

Signed this 5th day of October, 2006.